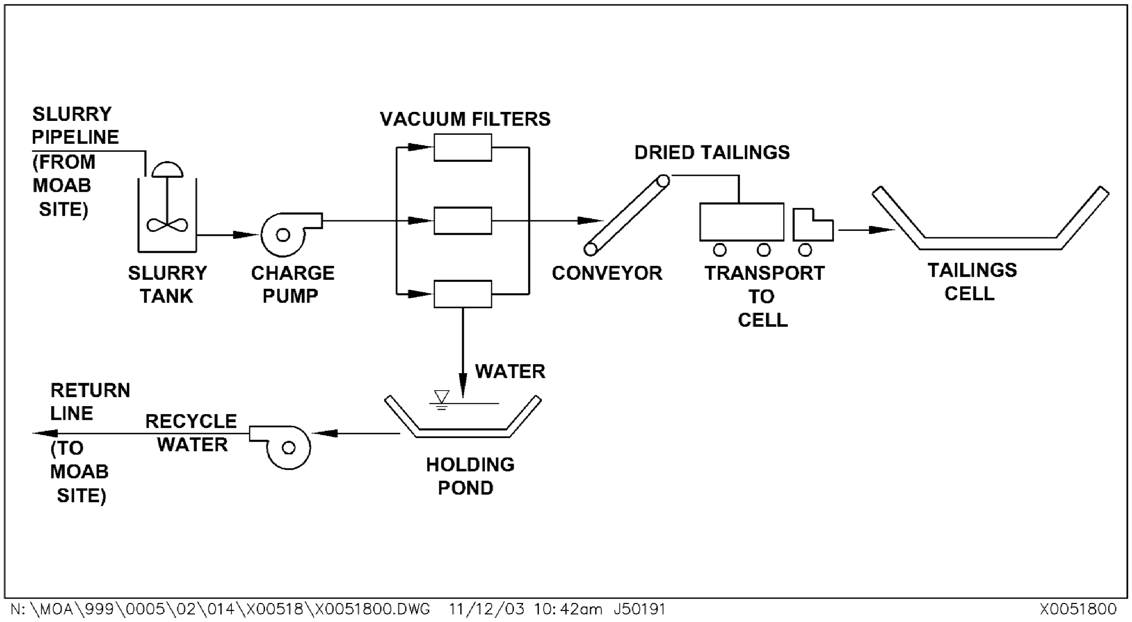

Figure 2–30. Filter Plant Process Flow Diagram

Table 2–14. Mainline Recycle Water Pump System Characteristics

Recycle Water Pipeline Corridor	Flow Rate (gpm)	Discharge Pressure (pounds per square inch)	No. of Pump Stations	Total Horsepower
Moab site–White Mesa Mill	1,172	940	1	918
Moab site–Klondike Flats	1,172	380	1	371
Moab site–Crescent Junction	1,172	640	1	625

Facility Footprints

Table 2–15 gives the estimated square footage requirements for the proposed facilities.

Table 2–15. Facility Land Use Requirements (Footprints)

Facility/Location	Footprint (ft^2)
Moab (common to all site alternatives)	67,000
Booster pump station (White Mesa Mill alternative only)	16,500
Terminal (common to all site alternatives)	40,625

Control/Monitoring and Safety Systems

Control and Monitoring

The slurry pipeline system would be controlled and monitored from a control room at the Moab site, which would be manned constantly. Control room operators/dispatchers would be alerted automatically if abnormal or emergency conditions, such as off-specification slurry, a leak, or a plug in the pipeline, were to occur. System control would be automatic in the steady-state mode. Operator intervention would be required only during process upsets, shutdowns, and restarts. For the White Mesa Mill corridor, isolation valves would be included at both sides of the Colorado River to minimize the possibility of slurry entering the river if a leak were to occur.

Safety

- *Leak Detection and Management*—The pipeline would contain only noncompressible, nonflammable, semiliquid slurry that would not pose an explosion or fire hazard. However, high-pressure slurry could be aggressively abrasive if a leak were to occur. The pipeline would be continuously monitored by a leak detection system. This system would provide operating data for the Supervisory Control and Data Acquisition (SCADA) system via a fiber optic telecommunication system. Flow rate, pressure, and density would be monitored at various points along the pipeline. A pressure monitoring station (two for the White Mesa Mill corridor) with a pressure transmitter powered by a solar panel or other power source would be installed. The objective of the leak detection system would be to detect leaks within 2 to 10 minutes of occurrence (depending on the size and the location of the leak), predict their location, and issue warnings to operators. If there were an indication of a leak, an inspection team would be dispatched. DOE's estimated theoretical spill volume for a pipeline leak is 0.65 to 1.3 yd^3 during the sensing period and 4 yd^3 after the system is shut down. The total spill volume for a leak is expected to be less than 5.2 yd^3 (PSI 2003).
- *Overpressurization Protection*—The pipeline and equipment would be protected from overpressurization by several levels of protection, including proven operating procedures, use of SCADA system software, electrical or hardware interlocks or control loops, and mechanical pressure-relieving devices.
- *Rupture Contingency Plan*—In the unlikely event of a pipeline rupture, installed systems would warn the operator with a prompt to consider activating an emergency shutdown sequence if the data appear valid. A break would result in some slurry loss. Repairs and cleanup, including lining repairs for short sections, could be made in a matter of a few days to 2 weeks.
- *Buried Pipeline*—Although the pipeline could be installed above ground and operated safely, DOE proposes to bury it in order to minimize conflicts with the public and also to prevent punctures from causes such as vehicles and gunshots.

Additional design techniques and safety factors would be applied for all special design points (e.g., thicker steel pipe wall at the river crossing). In areas of potentially severe erosion, design provisions would be based on maximum predicted flood events.

Post-Operational Activities

Post-operational activities would depend on DOE's ultimate decision on the fate of the pipeline. Some commenters have suggested that upon completion of slurry transportation activities the pipeline could be retrofitted for irrigation or other uses. However, any decision on such a future use would be predicated first on a decision that the use would be appropriate and second that a radiological release of the pipeline would be feasible and acceptable. These decisions could not be made until slurry transportation was complete. If DOE decided that other pipeline uses were not appropriate or feasible, upon completion of pipeline slurry operations, DOE would dig up the buried pipelines, compact them, and dispose of them in the disposal cell. The disturbed pipeline right-of-way would then be reclaimed and revegetated.

2.2.5 Construction and Operations at the Off-Site Disposal Locations

This section describes construction and operations at the off-site disposal locations. These activities would be essentially identical for the proposed Klondike Flats and Crescent Junction sites. Consequently, Section 2.2.5.1 describes activities for these two sites in terms of a "reference cell" that applies to both sites. The proposed cell design for the White Mesa Mill site is somewhat different because it is based on IUC's proposed design (IUC 2003). It is discussed separately in Section 2.2.5.2. For the purpose of describing these activities, the following sections address five main elements: (1) site preparation, infrastructure development, and control, (2) disposal cell construction, (3) tailings placement operations, (4) disposal cell cover construction, and (5) site reclamation.

2.2.5.1 Reference Disposal Cell

Figure 2–16 is a reference disposal cell site plan illustrating the major site features and approximate locations of temporary areas and facilities that would be used under the truck or slurry pipeline transportation alternative. Under the rail transportation alternative, the decontamination facility, worker access control, parking, fuel storage, and some stockpile areas would be located next to the train transfer point rather than adjacent to the disposal cell.

<u>Site Preparation, Infrastructure Development, and Controls</u>

Access Roads

The disposal cell would require new roads throughout the site to control the flow of traffic, allow access to material deliveries, and allow access to and from the contaminated haul road. DOE estimates that approximately 3,500 ft of contaminated and clean access roads combined would be required. New access roads would be 30 ft wide with a compacted gravel surface. Gravel road would be treated with dust control surfactant to reduce the need for water-consuming dust control measures.

Storm Water Control and Management

There are no major drainage channels currently entering any of the three alternative sites. Storm water management controls would be regulated under the Utah Pollutant Discharge Elimination System General Permit for storm water discharges from construction activities. Normal storm water control requirements generally are designed to control a reference storm event of a 25-year magnitude. Runoff ponds and ditches would be constructed at the transportation transfer station and the disposal cell to divert storm water away from facilities and operational areas. Hay bales and silt fences would be constructed to control sediment transport.

Radiological Controls

Radiological controls and decontamination procedures at the disposal cell would be functionally and operationally similar to those described in Section 2.1.1.1 and 2.2.1.1. One central access control location would be designated at either the disposal cell area entrance or the train/truck transfer station entrance for site radiological control as shown in Figure 2–16 (truck or pipeline transportation) and Figure 2–31 (rail transportation).

For the truck haul and slurry pipeline transportation alternatives, the contamination area boundary would encompass the disposal cell area and supporting construction facilities but would exclude the office trailer and parking lot areas. For the rail haul transportation alternative, the contamination area boundary would encompass the train/truck transfer station, the contaminated haul road from the transfer station to the disposal cell, and the disposal cell area but would exclude the office trailer and parking lot areas at the transfer station. Contamination control fencing would separate contaminated and uncontaminated areas at the transfer station and delineate the cell perimeter and both sides of the 2-mile haul road.

Water Storage Towers

Water storage towers would be placed at the disposal site and used to store water for nonpotable use such as soil compaction and dust control. Water from the Colorado River (allocated under existing water rights held by DOE, which authorize 3 cfs consumptive use) would be taken from the Moab site water storage ponds, loaded onto tanker trucks, and transported to the off-site disposal location, where it would be transferred into off-site storage towers (or possibly ponds).

Temporary Field Offices

The temporary field offices would be similar to those described in Sections 2.1.1.1 and 2.2.1.1 except that estimated discharge to the sanitary holding tank would be approximately 4,000 gallons per day. Potable water supply to the site would be locally supplied and delivered in portable, trailer-mounted water storage tanks and plumbed into the office units where appropriate. The offices would be located as illustrated in Figure 2–16 (truck or pipeline transportation) or Figure 2–31 (rail transportation).

Staging and Vehicle Maintenance Area

A staging area and a vehicle maintenance area would be constructed for storage of incidental construction materials and equipment and for on-site vehicle maintenance. Construction materials and equipment would require approximately 1 acre of open field for storage and would not require physical structures. The maintenance area would include construction of a portable structure (pole and canvas, 30 by 100 ft, dirt floor) to fully enclose excavation equipment requiring major equipment maintenance.

Fuel Storage and Refueling Area

Fuel would be supplied by local vendors and stored on the site. A central delivery point would be used to transfer the fuel to on-site 20,000-gallon fuel storage tanks. Multiple tanks would be located at both the Moab site and the off-site disposal location to accommodate fuel consumption requirements. Tank volumes would be sufficient to provide 1 week of demand. Refueling would require construction of a spill containment structure to safeguard the environment in the event of a spill. Vehicles and equipment would refuel as needed without exiting the contamination area under strict refueling plan guidelines. The areas would be located as illustrated in Figure 2–16 (truck or pipeline transportation) or Figure 2–31 (rail transportation).

Train/Truck Transfer Facility

For the rail transportation option only, a temporary train/truck transfer facility would be constructed to transfer tailings from the railcars to haul trucks. Figure 2–31 presents the overall plan for this transfer facility. It would consist of the rail spur and two sidings to allow train switchouts, a rotary bin to rotate and dump the railcars, a railcar decontamination station, a locomotive inspection pit, and a train fueling station. This area would also include support facilities for off-road haul truck maintenance and fueling and other site support facilities previously described, including field offices, equipment decontamination facilities, employee parking lots, and personnel radiological access control module.

Railcar Unloading and Decontamination

Gondola railcars delivering tailings to the train/truck transfer station would be guided into an open structure containing the rotary dump facility. The facility would consist of the rotary dump mechanism and a concrete bin directly below it to receive the dumped material. The train would approach the facility, and a car would be positioned in the center of the rotary dump. The railcar would be disconnected from the rest of the train. The rotary mechanism would connect to the car and then rotate it approximately 135 degrees to empty the car contents into the lower-level concrete bin (see Figure 2–23). The tailings would then be picked up by front-end loaders and loaded into haul trucks.

After dumping, the rotary mechanism would set the railcar upright, and the railcar would be reattached to the train. The train would pull the car forward into the decontamination area. Another full railcar would be positioned in the rotary dump, and the dumping process would be repeated. While the next car was unloaded, the previously unloaded car would be decontaminated. Its exterior would be decontaminated using high-pressure water hoses to remove visible contamination. Decontamination water would be captured below the decontamination pad in a process similar to that at the truck/equipment decontamination facility. It would flow through piping to a double-lined decontamination pond for reuse. Although most of the water would be recycled, some would be lost through evaporation. All decontamination wastewater remaining at the end of operations would be used for either moisture conditioning and compaction of cell materials or for dust control inside the cell construction area and would not be discharged to the ground water or surface water system. After decontamination, the railcar would be inspected, decontaminated again if necessary, and released. This process would be repeated for all cars until the entire train was emptied and decontaminated. It would then return to the Moab site for reloading. The unloading facility would include a rail siding adjacent to the track used for unloading. The additional siding would be used to stack a waiting train and for switching out trains to avoid track conflict.

Contaminated Haul Road to Disposal Cell

The rail transportation option would also require construction of a 30-ft-wide gravel-surfaced haul road from the transfer station to the disposal site; the length of the haul road would depend on the exact location of the disposal cell. The Crescent Junction haul road could be 1,000 to 8,000 ft long, and the Klondike Flats haul road could be 6,000 to 12,000 ft long. Haul trucks would deliver the tailings to the disposal cell. Stripping operations would remove and stockpile approximately 400 yd^3 of topsoil material strategically along the roadway alignment. The alignment would be finish-graded and would receive a 12-inch layer of compacted roadbase. Dust control surfactants would be applied.

<u>Disposal Cell Construction</u>

Topsoil Stripping and Stockpiling

The reference disposal cell footprint is a 3,340- by 1,670-ft rectangle on a relatively flat surface. Stripping operations would remove approximately 12 inches of topsoil from the cell footprint, haul road, stockpile areas, runoff collection pond, and runoff ditches; the estimated volume of stripped topsoil would be 234,000 yd^3. The stripped topsoil would be stockpiled for subsequent use in the final cover. Concurrently with topsoil stripping, runoff ponds and ditches would be constructed and water trucks would provide dust control as needed.

Excavation

The total volume of excavation would be approximately 3.5 million yd^3. Cell excavation would proceed sequentially in four relatively equal "subcell" areas. The cell would be excavated to a nominal depth of approximately 18 ft below grade, although the as-built dimensions could vary when the final location was chosen and actual site grade conditions were evaluated. The final cell configurations would also extend 29 ft above grade. The below-grade walls of the cell would slope inward at a 2H:1V slope. Excavated material would be hauled, dumped, and spread around the perimeter of the subcell to accommodate construction of the buttress as the excavation progressed. As material was delivered to the buttress area, soil compaction equipment would compact the buttress material.

Upon completion of subcell 1, excavation of subcell 2 would begin (Figure 2–32). A separation berm between subcells would serve as a haul route into the cell for the tailings filling operations. The excavation process would proceed in a similar manner until subcell 4 was complete. Additional cell volume above the estimated required size could be necessary to accommodate volumes of tailings that were underestimated or unaccounted for. Throughout excavation operations, a survey crew would maintain grade control, soil testing technicians would provide testing information for compaction and moisture control, and water trucks would provide dust control and soil moisture control support.

Subgrade Preparation

When excavation operations for subcell 1 were complete, subgrade preparations (that is, preparing the base of the cell to receive tailings) would commence. On the basis of past knowledge and the known geologic characteristics of the disposal site areas, DOE assumes that the subgrade materials would meet permeability requirements (see Appendix B) and that low-permeability additions to the existing soils would not be necessary. However, if testing were to prove otherwise, mitigating measures such as addition of bentonite to the subgrade soils would be employed. The subgrade surface preparation would consist of scarifying to a depth of 12 inches, moisture-conditioning to optimum moisture content (i.e., to achieve optimum compaction), processing the moisture and bentonite into the soil, and compacting the surface to its maximum density. Once subgrade grading and compaction requirements for subcell 1 were satisfactorily met, tailings placement would begin in subcell 1, and the subgrade preparation crew would move to subcell 2 to repeat the subgrade preparation operation. This sequence is illustrated in Figure 2–32.

Water from rainfall or construction activities in the individual cells would be collected in a lined sump to minimize seepage and conveyed from the cell for use in moisture conditioning or dust control. The lined sump would be removed before cell closure.

<u>Tailings Placement and Compaction</u>

Haul trucks would arrive at the disposal site by (1) direct haul from the Moab site, or (2) haul from the train/transfer station, or (3) haul from the slurry pipeline dewatering facility. The trucks would dump the tailings, dozers would spread the tailings to the precompaction thickness of 12 inches, and compaction equipment would compact them.

Optimum moisture content refers to the amount of moisture in the tailings that would allow the maximum control over compaction (e.g., sufficient moisture to lubricate the mineral grains). DOE assumes that the moisture content of the tailings arriving in the cell would be at or near its optimum for disposal in the cell, and that little, if any, processing would be required. However, in the event wetting or drying were needed, water trucks and tractors with disc harrow attachments would be employed to achieve the requisite moisture level.

Tailings would be loaded to an average above-grade depth of approximately 30 ft (Figure 2–33). When the loading of subcell 1 was complete, cover construction operations could commence. The tailings placement process would proceed sequentially until subcell 4 was complete to final grades.

<u>Disposal Cell Cover Construction</u>

The technical basis, as well as the basic types and thicknesses of cover construction materials for the reference off-site cover, would be similar to those previously described for the cover proposed for the Moab site under the on-site disposal alternative in Sections 2.1.1.3 and 2.1.3.1, and in Appendix B. However, the reference cell cover would be larger in overall area because of the configurational differences of the off-site cell and the Moab site tailings pile and because, in contrast to the Moab site cover, the off-site cover would overlie the buttress as well as the emplaced tailings. Also, only the vegetated erosion protection (riprap mixed with soil) would extend over the clean-fill buttress.

Borrow materials and excavated soil for constructing the buttress and cover would be delivered or stockpiled on the disposal cell site during the cell excavation and tailings placement operations. Cover construction would commence in subcell 1 of the disposal cell after tailings placement was complete and placement operations had moved into subcell 2. The final cover footprint would require an additional surface area of 63 acres of disturbance outside the disposal cell footprint. The total depth of the finished cover over the tailings would be 6 ft, and the total height of the completed cell would be up to 35 ft above grade. Figure 2–34 illustrates the reference cell cover and cover layer surface dimensions. The following subsections describe the amounts and placement of cover materials (see Figure 2–35).

Radon/Infiltration Barrier

Approximately 294,000 yd^3 of radon/infiltration barrier material stockpiled on the site would be transported to the cell area and emplaced on the tailings in three loose lifts, or stages, that would be sequentially compacted to a final required 1.5-ft thickness and reference density. The final placement would be graded to finish-grading specifications. If necessary, water would be added to achieve optimum moisture content for compacting.

Coarse-Sand/Fine-Gravel Capillary Break

The capillary break layer would be approximately 215,750 yd^3 of a selected blend of coarse sands and fine gravels. The material would be transported from the stockpile area to the cover placement area and dumped. It would then be spread and compacted to a depth of 6 inches. The material would be compacted in its natural moisture state and would have no moisture content or density requirements.

Fine-Grained (Water Storage) Soil Layer

The fine-grained soil layer would be approximately 1.1 million yd^3 of a borrow material that would be imported and stockpiled on site. The material would be spread to a loose depth of 3.5 ft. It would have no moisture content or maximum density placement requirements.

Soil/Rock Admixture Layer

The soil/rock admixture layer would consist of approximately 154,000 yd^3 of borrow material, of which 20 percent would be riprap no greater that 12 inches in diameter. It would be spread to a final loose depth of 6 inches and would have no moisture content or maximum density placement requirements. Once satisfactory depths and mixture ratio were achieved, a tractor and disc harrow would blend the two soil types.

Side Slope Riprap/Soil-Filled Voids Layer

The riprap/soil-filled voids layer would consist of approximately 43,000 yd^3 of borrow material, of which 20 percent would be riprap no greater that 12 inches in diameter. The riprap would be placed to a final depth of 12 inches and would have no moisture content or maximum density placement requirements. Once satisfactory depths were achieved, soil would be placed over the riprap to fill voids. A tractor and chain/blanket mat would pass over the soil to work the material into the voids. Areas that received a surplus of soil would require hand raking to achieve uniform placement.

Site Reclamation

Before the last portion of the cover was emplaced, removal of contaminated facilities and contaminated areas of temporary construction facilities would begin. Noncontaminated temporary facilities such as office trailers, access roads, and employee parking lots would remain until the end of cell cover placement.

All disturbed areas within the contaminated site boundary would be verified to meet cleanup standards prior to cell closure and backfill. Any contaminated material would be excavated and placed in the disposal cell. Areas of surface disturbance caused by construction activities outside the disposal cell final footprint and permanent drainage ditches, such as areas that supported construction of haul and access roads, construction facilities, construction materials, and cover material stockpiles, would be rough-graded and backfilled with the remaining topsoil stockpiled from stripping operations. The topsoil would be excavated from the stockpile area, transported to these areas, dumped, and graded in preparation for final reclamation. Impermeable membrane liners used in decontamination ponds, storm water control ponds, and slurry operations would be removed and disposed of in the disposal cell. The ponds would be backfilled to original grades prior to final reclamation.

All remaining structures and facilities used for cell construction and loading, including buildings, trailers, fuel storage areas, concrete slabs, water towers, and all elements of the transportation infrastructures, would be disassembled and either disposed of in the cell, salvaged, or properly disposed of in accordance with applicable federal, state, and local requirements.

The disposal cell site would be completely fenced with standard 6-ft-high chain-link security fencing with a three-strand barbed wire top and gated at the access road. The proposed fence area is illustrated in Figure 2–34. Final reclamation activities would be implemented at the cell disposal area and transportation facility area and would consist of seeding with native or adapted plant species.

2.2.5.2 White Mesa Mill Disposal Cell

The design and specifications proposed for the White Mesa Mill site are somewhat different from those proposed for the Klondike Flats and Crescent Junction sites because they are based on an unsolicited proposal submitted to DOE by IUC (IUC 2003). This cover approach reflects an alternative design that is more typical of UMTRCA Title II uranium mill tailings reclamation and is similar to that proposed in NRC's 1999 EIS (NRC 1999). A brief description of the White Mesa Mill cover design is included in Appendix B. DOE has reviewed the design and has determined it to be reasonable at the conceptual level. This section describes the activities that would occur if the IUC proposal were implemented. The conceptual design is strictly intended to establish a reasonable basis for evaluating environmental impacts associated with this component of site remediation and reclamation. This assumed design is not intended to commit DOE to any specific cover design.

IUC proposes to dispose of contaminated materials from the Moab site and vicinity properties at its White Mesa Mill site, assuming it received a license amendment from the State of Utah for its current operations there. Although the facility has an NRC-issued license to receive, process, and permanently dispose of uranium-bearing material, it would need a license amendment from the State of Utah before it could accept material from the Moab site. (Effective August 16, 2004, NRC transferred to Utah the responsibility for licensing, inspection, enforcement, and rulemaking activities for uranium and thorium milling operations, mill tailings, and other wastes.) If the IUC White Mesa Mill were selected as the final disposal site for the Moab tailings, the proposed changes to IUC disposal capacity and engineering design would require prior UDEQ approval and issuance of a State Construction Permit and possibly a modification of a State Groundwater Quality Discharge Permit. Details regarding appropriate engineering design, construction requirements, operational mandates, monitoring needs, and closure stipulations would be determined by UDEQ at that time. Disposal of the Moab tailings at White Mesa Mill would be performed under a reclamation plan approved by the State of Utah. Because IUC's cells and reclamation plans would be state-approved, DOE assumes that they would meet all applicable state and federal regulations. IUC would be responsible for all material, design, and performance compliance issues concerning disposal operations, cell construction, and cover performance. Tailings placement would be performed under IUC's direction by either IUC personnel or by an outside contractor. IUC would oversee the outside contractor and would be responsible for quality assurance/quality control to ensure that all design and performance specifications were met.

Tailings would be transported approximately 85 miles to the White Mesa Mill site by either truck or slurry as described in Section 2.2.4. Under the slurry transport option, IUC would take ownership of the Moab site tailings at the entrance to the slurry pipeline system. If the tailings were trucked, DOE would retain ownership until they were received at the White Mesa Mill site.

Summary of IUC's White Mesa Mill Disposal Cell Construction and Operations Proposal

Figure 2–36 illustrates the general layout of the IUC's proposed wet and dry cell, and Figure 2–37 is a schematic cross-section. The cell would be approximately 18 ft below grade. Dimensions would depend on the final cell location and configuration, which would be based on actual site grade conditions. The interior cell sideslopes below grade would be constructed at 3H:1V. Excavation operations would remove subgrade materials to the final depth of the cell, which would have a 12-inch compacted clay liner. Excess excavated material would be delivered to the buttress area, where soil compaction equipment would compact it to form the cell buttress. The cell buttress would have 5H:1V exterior slopes. After the starter cell was filled, excavation and tailings placement would proceed sequentially as previously described for the Klondike Flats and Crescent Junction cells. Maximum cell dimensions would be approximately 3,500 by 1,800 ft, creating a disposal cell approximately 145 acres in area. Final cell size would be determined by the final quantity of tailings placed.

If the tailings were delivered by slurry pipeline, they would be processed as described in Section 2.2.4 and placed in a 30-acre "starter" dry cell that would be constructed for initial storage. Fluids not immediately repiped to Moab would be stored in a "wet" cell for later use as makeup water. The wet cell would have a geosynthetic high density polyethylene liner (Figure 2–38).

Truck-transported tailings or dried slurry materials from interim storage would be placed in the cell using conventional earth-moving construction techniques. In the case of truck-transported materials, the highway trucks would dump their loads, and front-end loaders would transfer tailings to off-highway (on-site) trucks for delivery to the dry cell. Deposited tailings would be bladed to a depth of 6 to 9 inches prior to compaction to 90 percent of maximum dry density. A water truck would provide water for dust control or for any moisture necessary for compaction. Dry cell placement would be continuous as excavation and preparation of cell capacity progressed ahead of tailings placement.

A survey crew would maintain grade control throughout the excavation operation. Soil testing technicians would provide information for compaction and moisture control. Water trucks would operate in tandem with the construction operations to provide dust control during excavation operations and soil moisture control for construction of the buttress.

Approximately 35,000 yd^3 of debris are believed to exist in the Moab site. Debris would be transported by truck to White Mesa Mill for placement in the dry cell. Before leaving the site, trucks would be scanned for radioactive contamination and decontaminated at a wash facility operated by the mill. DOE estimates that approximately 2,200 truckloads of debris would be shipped.

Summary of IUC's White Mesa Disposal Cell Cover Proposal

Figure 2–39 illustrates details (materials and thicknesses) of a typical reclamation cover that IUC proposes to construct. This proposed cover differs somewhat from the cover previously described for the reference cell but is typical of other NRC-approved covers for private licenses.

Components of the final top cover from the top down would consist of erosion protection riprap, a frost barrier, a compacted clay radon barrier, and a platform fill layer directly over the tailings. The side slope cover would consist of random fill covered by riprap. On-site borrow is available for all material except the riprap. Quarries located north of Blanding, approximately 8 miles from the White Mesa Mill site, would be used as the riprap source. Placement of these layers would be similar to that previously described for the reference cell. The materials would be stockpiled near the cell, then emplaced and compacted using standard construction equipment and techniques.

2.2.6 Monitoring and Maintenance

After completion of tailings placement and site reclamation, monitoring and maintenance of an off-site disposal cell at any of the three proposed locations would be in accordance with the Long-Term Surveillance and Maintenance Plan approved by NRC. Drainage areas and other areas susceptible to erosion would be inspected and repaired as needed.

Monitoring and maintenance procedures for the reference off-site disposal cell and the White Mesa Mill off-site disposal cell would be similar but not identical. An example of how monitoring and maintenance at the White Mesa Mill disposal cell would differ from the reference cell would be the need to manage storm water and internal infiltration drainage from upslope disposal cells at the White Mesa Mill site. There are no preexisting upslope cells with the reference cell design. Another example would be the need to operate and monitor the liner, drains, and leak detection system that would ostensibly be left in place in cell 4B at the White Mesa Mill site. This type of drainage system would not be used with the reference cell design.

2.2.7 Resource Requirements

This section describe DOE's estimate of the major resource requirements for the off-site disposal alternative.

2.2.7.1 Labor

Table 2–16 through Table 2–18 show the estimated average annual labor requirements. In all cases, the labor category "Site Support" represents construction oversight personnel employed by the Technical Assistance Contractor for DOE.

Off-site disposal would require construction labor to be performed at the Moab site, vicinity properties, borrow areas, and the selected disposal cell site. It would also require transportation-related labor. DOE's estimates of the average annual labor requirements for construction-related activities for the Moab site, vicinity properties, borrow areas, and the selected disposal cell would be the same for all three modes of transportation. In general, single numbers in Table 2–16 through Table 2–18 indicate the labor for a single 12-hour shift working 7 days a week, 350 days a year. A double-shift schedule would require 67 to 100 percent more total work force to accomplish the same work. Where dual numbers are shown in the tables, they indicate the labor required for a single 12-hour shift (lower number) versus a double 10-hour shift schedule.